RED ROCK CANYON BLAKISTON FALLS NATURE TRAIL

WATERTON LAKES NATIONAL PARK, ALBERTA

Notes for a self-guided tour

This nature trail follows an easy course along Red Rock Canyon and back down to Blakiston Falls, a distance of about a mile and a half. Geological features are highlighted because there are particularly fine examples to be seen along this trail. Use same trail to return to parking lot near bridge.

What made the mountains?

About 1,000 million years ago the whole area which is now the Rocky Mountains, including Waterton Lakes National Park, was an ancient shallow sea extending from Alaska to about Mexico and had an east-west width of several hundred miles. Silts, sands and mud brought in by rivers from either side of this sea settled on the bottom, layer upon layer for hundreds of millions of years. As these layers piled up one on top of the other, the lower layers were compressed by the weight of those on top, and hardened into rock. As the burden became heavier the layers slowly sank deeper and deeper until they became several miles thick! There is evidence that the sea was nearly always shallow. The sea bottom sank into the earth's crust as the accumulation continued.

Beginning 60-70 million years ago, the sea began to disappear as the land was lifted above sea level due to tremendous pressures set up within the earth's crust; it was then that the Rocky Mountains began to emerge. The lifting and compressing effect of these forces caused the thick rock to fold, twist and crack. There are no folds and cracks at this spot but you can see a tilt in the layers on Mount Blakiston to the south. There are some folds at Blakiston Falls. What titanic forces must have raised, folded, and cracked rock, miles thick, hundreds of miles wide and thousands of miles long!

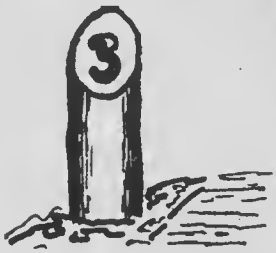
What shaped the mountains?

As these sediments were lifted above the water, erosion stripped off the top layers and formed deep canyons and valleys. The faster they were lifted the faster they were eroded. Of the whole Rocky Mountain region made by this geological upheaval, the area of Waterton-Glacier International Peace Park rose the fastest due to an extra force, (the Lewis Overthrust), which resulted in the greatest amount of erosion anywhere in the Rocky Mountains. In fact, the rock exposed at Cameron Falls is the oldest sedimentary rock exposed anywhere in the Rocky Mountains.

Actually the mountains you see about you are only about 50 million years old but the rock they are made of is about 1,000 million years old.

Beginning about a million years ago, there was another great change on earth—the ice age. At least three times the huge ice fields came and disappeared in this mountain region. Each time it filled the valleys with enormous, slow moving rivers of ice. These glaciers deepened and widened the valleys, made the lakes and sculptured the mountains. The last time the ice retreated it left the park much as it is today. Further small changes took place on the high mountains beginning about 4,000 years ago during the so-called "Little Ice Age". Warm periods such as the last which occurred from 1900 to 1950 have interrupted this colder period and have caused considerable shrinkage and even disappearance of the glaciers to the north and south of Waterton. In Waterton Lakes National Park, glaciers no longer exist.

What made the canyon red?

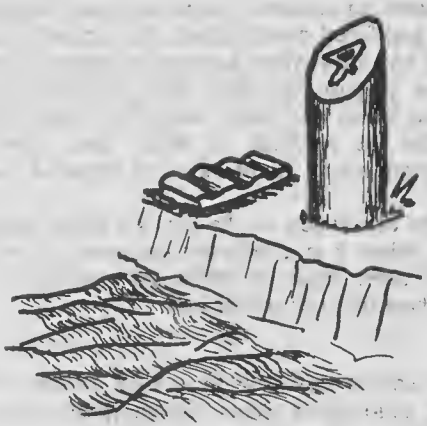


Sands and muds filled this ancient sea and some of the muds contained iron compounds. During this time the sea was very shallow, so shallow that it regularly disappeared and exposed the mud flats to the air for long periods of time. The iron rusted (oxidized) to form the red mineral hematite which gives red colour to the rock seen on the canyon walls.

The greenish bands within the red ones on the opposite side of the canyon also contain iron minerals but have not been oxidized to the same extent as the reddish areas.

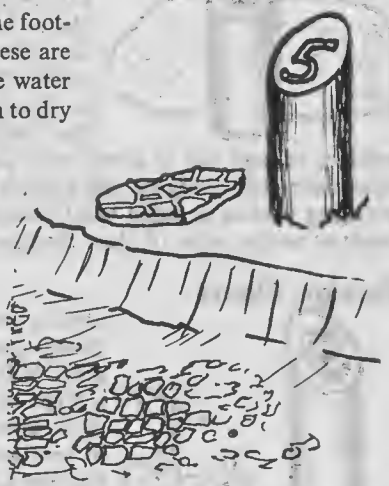
Over millions of years these red sediments slowly sank to make room for more sediments until several hundred feet of this red rock was formed. We call this the "Grinnell" formation.

Ripple marks



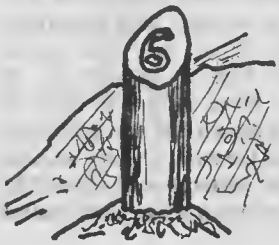
The rock upon which you are now standing has a ripply surface. These ripple marks are similar to those forming at present in shallow places of moving water in many lakes and streams in the park. These ripple marks are evidence showing that these red sediments formed in very shallow water.

Mud Cracks



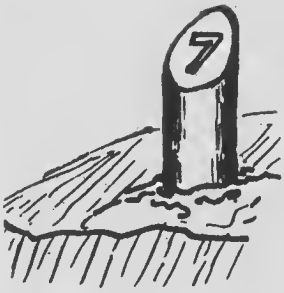
Do you see the honeycomb patterns in the footpath and in the rock beside the post? These are "mud cracks". They happened when the water retreated from the mud flats and left them to dry and crack. When the water returned it filled the cracks with slightly different mud or sand which later hardened as the other layers settled on top. The presence of these mud cracks is further evidence that these sediments were brought into a very shallow sea which frequently retreated to expose the sediments to the sun. Erosion has since taken off many thousands of feet of layers that were on top and this has revealed what happened here about a 1,000 million years ago.

The canyon



When the last main valley glacier disappeared, the creek in Red Rock Canyon flowed at approximately the same level at which you are now standing. Gradually, over thousands of years, rapids and falls cut out the canyon to its present depth of 70 feet or more and eroded their way a mile up the valley.

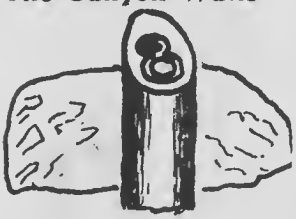
Shrubs



Shrubs serve an extremely important part in soil building and forest development. These plants can find root and grow where large trees cannot, so in time they prepare the right kind of soil from their dead leaves and roots, and offer shade and shelter for the seedlings of larger trees. Trees seldom grow where shrubs have not prepared the way.

Right beside you to the left is a Sitka alder and just below it is a red-osier dogwood. About 10 or 11 other kinds of shrubs grow along this trail too and we have put labels on them for your convenience.

The Canyon Walls

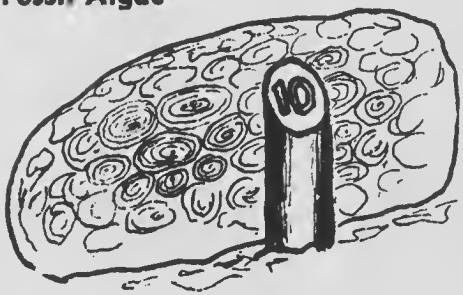


Shrubs cannot grow on bare rock unless the pioneer soil-making plants, lichens (pronounced LIKE-ENS) and mosses prepared the way. These plants because of their small size and special adaptions, can grow on sheer cliffs and barren terrain. They produce the first soil by decomposing or digesting the rock they grow on and catching the wind-blown dust. Eventually these plants will produce enough soil to grow larger plants. Grasses, shrubs, then trees will in time completely overgrow the canyon walls except on the sheerest faces. This changing process is called plant succession. The mountain forests are the end result of such a series of plant changes on the same area.

Foreign Plants

During the course of a summer hundreds of kinds of flowers grow here in a continuously changing display. Some of the plants around this post are foreign to the park. Such plants as pineapple weed, knot-grass, and others came over to Canada in seed grains from Europe then found their way into the park.

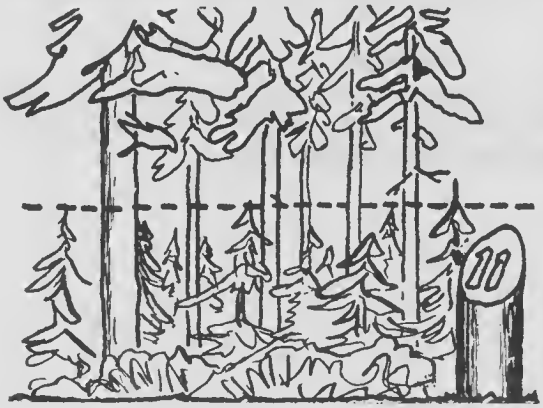
Fossil Algae



The large oval rock beside the numbered post came from farther up stream along Bauerman Brook Valley, and was transported here by glacial ice. It comes from a 50-foot layer of rock exposed on the mountain sides to the west. The fine delicate circular patterns were formed by very primitive water plants called

algae. These same species of algae are still growing in very shallow sea water in different parts of the world and are producing the same patterns in the sediments as in this rock. This further proves that the rocks in these mountains were formed from deposits in a shallow sea, and that there was simple plant life here about a thousand million years ago.

The Struggle of Plant Succession



When glaciers are active, they carry much rocky debris along with the ice. When they melt, this debris is left in long rows or moraines. These moraines are eventually colonized by a succession of plants, the first of which are "pioneer" plants, lichens, mosses and seed plants. It is then easy for shrubs and trees to grow.

The present dominant growth here is lodgepole pine, but notice that underneath there is a dense growth of Douglas fir 10-15 feet high. The pines have enriched and prepared the right kind of soil and offered the necessary shade to start the fir seedlings. In about 100 years the fir trees will outgrow the pines and give rise to yet another plant community. The lodgepole pine will die and its dead fibres will feed the earth and the richer earth will nourish the living plants.

Blakiston Falls

The same erosional forces that formed Red Rock Canyon formed the canyon here. However, this canyon is not as deep nor as long as Red Rock because the rocks in this canyon are somewhat harder.

The rocks at this locality belong to the Appekunny formation. They consist of sandstones, silt stones and mudstones. Fossil ripple marks indicate that they originated as sands and muds which accumulated in very shallow water. Fossil mud cracks indicate that there was occasional exposure to the air.

Birds

Probably the most common birds seen in this area are the noisy flocks of red cross-bills and pine siskins. Magpies and the occasional crow stay here all summer because they naturally prefer campground areas for the scraps of food they may find. A rather shy, but interesting bird may sometimes be seen along the stream. The water ousel or "dipper" is famous for the rapid knee-bending exercises performed on landing. Other birds seen along the trail are: McGillivray's warbler, white-crowned sparrow, red-breasted nuthatch, and the grey or Canada jay. On the trail to Blakiston Falls you may hear the loud rasping call of the Clark's nutcracker, a bird which prefers to inhabit the high altitudes.

Animals

A salt lick near the main bridge attracts the mule deer and Rocky Mountain sheep. Columbian ground squirrels are usually common. Chipmunks and red squirrels are often seen along the trail to Blakiston Falls.

The animals, plants and all other natural features of this park are protected and preserved for all who may come this way. Please do not harm, remove or damage them.

71-69

FOR YOUR NOTES

RED ROCK CANYON–BLAKISTON FALLS NATURE TRAIL MAP